ACTIVITIES OF THE FRASER RIVER JOINT ADVISORY BOARD

TWENTIETH ANNUAL REPORT

APRIL 1, 1987 TO MARCH 31, 1988

CANADA — BRITISH COLUMBIA AGREEMENT, MAY 24, 1968

FLOOD CONTROL IN THE FRASER VALLEY

90-03177/

FRASER RIVER JOINT ADVISORY BOARD

BRITISH COLUMBIA

T.R. Johnson
P.M. Brady
J.D.C. Fuller

CANADA

D.K. Dawson
E.M. Clark
D.L. Deans

March 31, 1988

Dear Mister Minister:

The Fraser River Joint Advisory Board herewith submits its 20th Annual Report for the year ending March 31, 1988 in accordance with the requirements of paragraph 18(a) of the May 24th, 1968 Agreement.

Respectfully submitted

J. O'Riordan

J. O'Riordan, Chairman,
Fraser River Joint Advisory Board

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INTRODUCTION

The Federal-Provincial Agreement governing this Program was signed on May 24, 1968 to provide flood protection for the Lower Fraser Valley in British Columbia over a ten-year period. The Agreement provides for rehabilitation of river and sea dykes, for bank protection to ensure safety of dykes against erosion, and for pumping capacity and main drains to prevent flooding behind the dykes as a result of runoff. Projects approved must be practical, engineeringly sound and economically justified. As a result of increased costs all drainage works have been deferred to give first priority to completion of the dykes and bank protection necessary to prevent major flood damages.

The Agreement has been amended five times, primarily to provide additional funds and extend the termination date to March 31, 1995. The current level of funding is $80.5 million from each government of $161.0 million in total. The projected annual funding is approximately $2.5 million from each government.

Up to March 31, 1988 expenditures under the Program amounted to $129.6 million.

The federal-provincial Fraser River Joint Advisory Board is responsible for administration of the Program under the Agreement. The British Columbia Ministry of Environment, Environment Canada and Fisheries and Oceans Canada are represented on the Board which is co-chaired by members of the federal and provincial environment agencies.

The names of Board Members for the report year are shown on the letter of transmittal.

Program Project Sign

Meetings

The 36th Board Meeting was held on March 18, 1988.

Board Submissions

A Board submission was made to the Ministers recommending funding of Glen Valley Project Stage 1 works at $2,475,000.

APPLICATIONS TO PROGRAM

Project	Date of Application
Kent	March 3, 1969
Pitt Meadows	March 3, 1969
Richmond	March 3, 1969
Surrey: Dams	May 6, 1969
Sea Dykes	
Upstream Dykes	
South Westminster Area	
Matsqui	May 15, 1969
Abbotsford (Sumas)	May 15, 1969
Chilliwack	August 1, 1969
Delta	August 1, 1969
Mission	August 4, 1969
Maple Ridge	October 1, 1969
Harrison Hot Springs	February 27, 1970
Vedder River	April 10, 1970
City of Port Coquitlam and District of Coquitlam	April 30, 1970
Colony Farm	August 24, 1970
Burnaby	November 26, 1970
New Westminster	December 18, 1970
Chilliwack Indian Reserves Nos. 3 and 4	March 8, 1971
Seabird Island	October 8, 1971
Langley	March 2, 1972
Dewdney Area Improvement District	April 30, 1973
Kamloops	October 28, 1973
East and West Nicomen Dyking District	February 15, 1974
Glen Valley Dyking District	February 20, 1974
Nicomen Island Improvement District	September 13, 1974
City of Vancouver - Southlands	May 26, 1987

ENGINEERING

Engineering services for Kent, Pitt Meadows, Delta, Dewdney and Glen Valley projects were provided by outside consulting companies. Services for Dewdney, Chilliwack and Kent bank protection work were provided by provincial government staff.

TABLE I

PROJECT DESIGN STATUS

Local Authority	Project No.	Project Description	Progress for Final Design*
District of Kent	1.1	Upgrading of dykes, bank protection, drainage discharge structures, and main drains in the Agassiz and Harrison Mills areas.	Dyke design is complete. Reconstruction of Duncan-Bateson floodbox is complete.
District of Pitt Meadows	2.1	Upgrading of dykes, bank protection, drainage discharge structures, and main drains in the Maple Ridge Dyking District.	Dyke design is complete.
	2.2	Upgrading of dykes, bank protection, drainage discharge structures, and main drains in Pitt Meadows Area 2.	Design work continuing.
Township of Richmond	3.1	Upgrading of dykes, bank protection, drainage discharge structures, and main drains of that part of Lulu Island west of Queensborough.	This project is complete.
District of Matsqui	4.1	Upgrading of dykes, bank protection, draining discharge structures, and main drains in Matsqui Dyking District.	This project is complete.
	4.2	Extension of bank protection upstream of project 4.1.	This project is complete.
District of Chilliwack	5.1	Upgrading of dykes, bank protection, drainage discha..ge structures, and main drains for the District and Chilliwack Indian Reserves 3 and 4.	Design is complete except for the dykes through the Indian Reserve and south of Minto Landing. Dyke right-of-way through the Indian Reserves was not granted.
	5.2	Realignment of the dyke across Chilliwack Indian Reserves 3 and 4.	Detailed dyke design is suspended. A status report has been completed.
	5.3	Dykes and bank protection to protect the District of Chilliwack and the District of Abbotsford from flooding by the Chilliwack-Vedder River.	This project is complete.
District of Delta	6.1	Upgrading of dykes, bank protection, drainage discharge structures, and main drains in Delta, including the Fraser, Tsawwassen Indian Reserve and Boundary Bay dykes.	Design of this project has been completed except for Boundary Bay Village, for which it is continuing.
	6.2	Upgrading of dykes, bank protection, drainage discharge structures, and main drains on Westham Island.	Design to full Program Standard has been deleted from the Program since the viability of the project could not be shown.
District of Mission	7.1	Reconstruction of dykes, bank protection, drainage discharge structures, and main drains in the Mission City area.	Design work continuing.

*See Note on final page of this table.

. . . . continued

TABLE I (cont'd.)

Local Authority	Project No.	Project Description	Progress for Final Design*
District of Abbotsford	8.1	Upgrading of Vedder Canal west bank dykes, the Sumas River dykes, bank protection, replacement of the Sumas Pump Station and Sumas River Dam.	This project is complete.
Village of Harrison Hot Springs	9.1	Upgrading of the Harrison Hot Springs dyke.	Design work has not yet commenced on this project.
District of Surrey	10.1	Repair of the Serpentine and the Nicomekl River dams.	This project is complete.
	10.2	Upgrading of the Mud Bay Dyking District sea dykes, to prevent flooding by the sea, provision of bank protection and upgrading of internal drainage work.	Design to full Program Standard has been deleted from the Program since the viability of the project could not be shown.
	10.3	Upgrading of flood protection works to prevent damage to land from internal damage flooding and flooding from the Serpentine and Nicomeki Rivers.	This project has been deleted from the Program as it could not be shown to be economically viable.
	10.4	Reconstruction of dykes and floodboxes in the South Westminster area.	This project is complete.
	10.5	Upgrading of the Crescent Beach sea dykes, their erosion protection and internal drainage works.	Design to full Program Standard has been deleted from the Program since the viability of the project could not be shown.
City of New Westminster	11.1	Upgrading of Lulu Island, Queensborough area dykes, bank protection and internal drainage works.	This project is complete.
District of Langley	13.1	A dyke, a Salmon River discharge structure and possibly main drain work on the floodplain.	Design work has not yet commenced on this project.
	13.2	Flood protection for other adjacent District of Langley undyked areas.	Design work has not yet commenced on this project.
	13.3	Upgrading of the Glen Valley Dyking District flood protection works.	Design work continuing.
District of Coquitlam and City of Port Coquitlam	14.1	Upgrading of Pitt River dykes, drainage discharge structures, and main drains protecting the City and the district south of DeBoville Slough.	This project is complete.
	14.2	Upgrading of Pitt River dykes, drainage discharge structures, and main drains protecting the District north of DeBoville Slough.	Design to full Program Standard has been deleted from the Program since the viability of the project could not be shown.

*See Note on page following.

. . . . continued

TABLE I (cont'd.)

Local Authority	Project No.	Project Description	Progress for Final Design *
	14.3	Proposed construction of works to prevent flooding from the Coquitlam River.	Design work has not yet commenced on this project.
District of Maple Ridge	15.1	Upgrading of flood protection works for several small dyked areas in the District.	Design to full Program Standard has been deleted from the Program since viability of the project could not be shown.
Province of B.C.	16.1	Upgrading of the flood protection works of Colony Farms.	Design to full Program Standard has been deleted from the program since viability of the project could not be shown.
Department of Indian and Northern Affairs	17.1	Proposed construction of bank protection works on Seabird Island.	Based on estimated costs and benefits, further work cannot be justified on the basis of existing Program criteria.
Dewdney Area Improvement District	18.1	Upgrading of the Dewdney Area Improvement District flood protection works.	Bank protection design by the Province complete. Dyke design is complete.
	18.2	Norrish Creek flooding study.	Consultant studies completed. Further investigations continuing.
East and West Nicomen	19.1	Upgrading of dykes, bank protection and internal drainage works in East and West Nicomen and I.R. 16, upstream.	Design work has been postponed on this project.
City of Kamloops	20.1	Upgrading and construction of flood protection works in the Oak Hills area on the west bank of the North Thompson River in the City of Kamloops.	This project is complete.
	20.2	Upgrading and construction of flood protection works in the remainder of the City and on the North Thompson, South Thompson and Thompson Rivers.	Design work has not yet commenced on this project.

*NOTE: It should be noted that the Project Description includes the reconstruction of main drains and pumphouses. This aspect of each project has been deferred for the time being except where construction has been commenced or drainage works are integral with a dyking system.

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Inland Waters
Environment Canada

CONSTRUCTION

The information given in the following area-by-area breakdown is for projects on which significant activity occurred during the year. The locations of these works are shown on the map at the end of this report.

Kent

Project No. 1 – District of Kent. The project originally consisted of 11.5 miles of dyking, 8 miles of bank protection, 3 pumping stations, 3 floodboxes and improvements to internal drainage.

Emergency repairs to bank protection at site 'G-1' in the amount of $100,000 were completed in June 1987. A further $29,000 was spent on additional repairs at site 'G' in March 1988.

Monitoring of erosion sites will continue.

Delta

Project No. 6 – District of Delta. The project originally consisted of the rehabilitation of 27 miles of dyke, 8 miles of bank protection, 3 pumping stations and 12 floodboxes. The Delta project is now complete except for the Boundary Bay Village area.

Mitigative work in the salt marsh at the Tsawwassen Indian Reserve dyke was completed.

A special report on a perched beach option for flood protection in the Boundary Bay Village area is being prepared by the consultant.

KENT — Site 'G-1' bank protection improvements.

DELTA — Mitigative work in the salt marsh at Tsawwassen Indian Reserve.

Chilliwack

Project No. 5 – District of Chilliwack. The project originally consisted of 17.0 miles of dyking, 4.0 miles of bank protection and drainage improvements. This project was completed some years ago except for the section of dyke from Minto Landing to Chilliwack Mountain. A substantial portion of this uncompleted section is located within the Indian Reserve lands.

A report on the feasibility of dyking from Minto Landing to Chilliwack Mountain was completed and was discussed by the Joint Advisory Board. Further studies determined that the effect of an outside alignment (wing dyke) on water levels upstream would be minimal.

Bank protection at site '7' in Chilliwack, commenced the previous year, was completed at a total cost of $91,000.

Glen Valley

Project No. 13 – Glen Valley Dyking District. The project consists of the rehabilitation of 6.3 miles of dyke in the Glen Valley Dyking District.

A contract for reconstruction of the west wing dyke and Fraser River bank protection will be tendered in fiscal year 1988/89.

An alternative east wing dyke drainage option was reviewed by the consultant and it was found that significant construction cost savings can be achieved.

CHILLIWACK — Site '7' completed bank protection.

GLEN VALLEY — West wing dyke looking south,
(Nathan Creek to right of picture).

Dewdney

Project No. 14 – Dewdney Dyking District. The project consists of the reconstruction of 7.7 miles of dyke, 1.9 miles of bank protection, improvements to the Hatzic Slough dam and repairs to the existing floodbox.

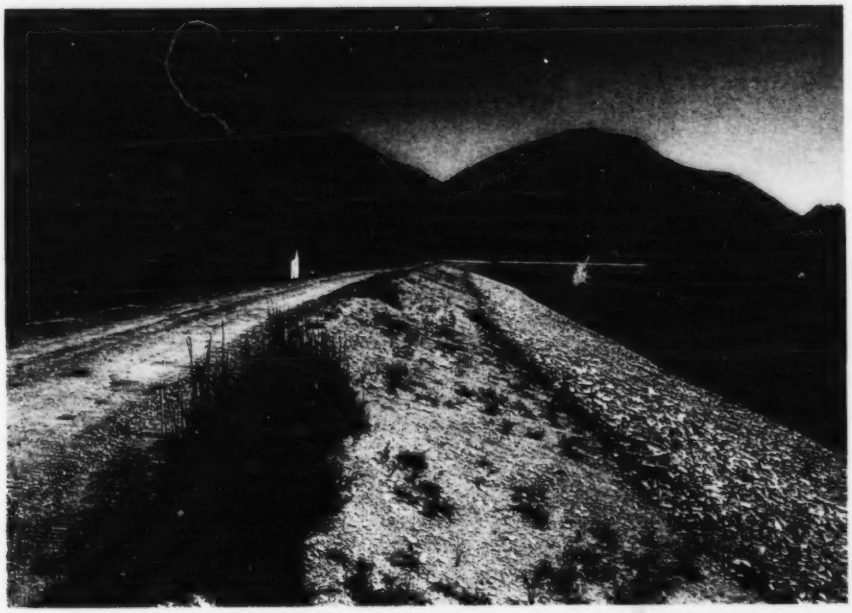
Rehabilitation of the Hatzic Slough outlet works and all bank protection was completed. Only finishing work on the dyke remains to be completed during 1988/89 fiscal year.

Expenditure for the fiscal year was $3.2 million.

Pitt Meadows No. 2

Project No. 2 – District of Pitt Meadows. This project consists of the reconstruction of 5.4 miles of dyke, 0.5 miles of bank protection and the replacement of one floodbox.

A contract for the reconstruction of 1.4 miles of dyke between Richardson Road and Sheridan Hill was awarded. A final contract for construction of a new pumpstation/floodbox at Fenton Slough will be called in fiscal year 1988/89. Pumpstation costs will be paid under a Canada-British Columbia Agricultural and Rural Development Subsidiary Agreement (ARDSA) drainage project.



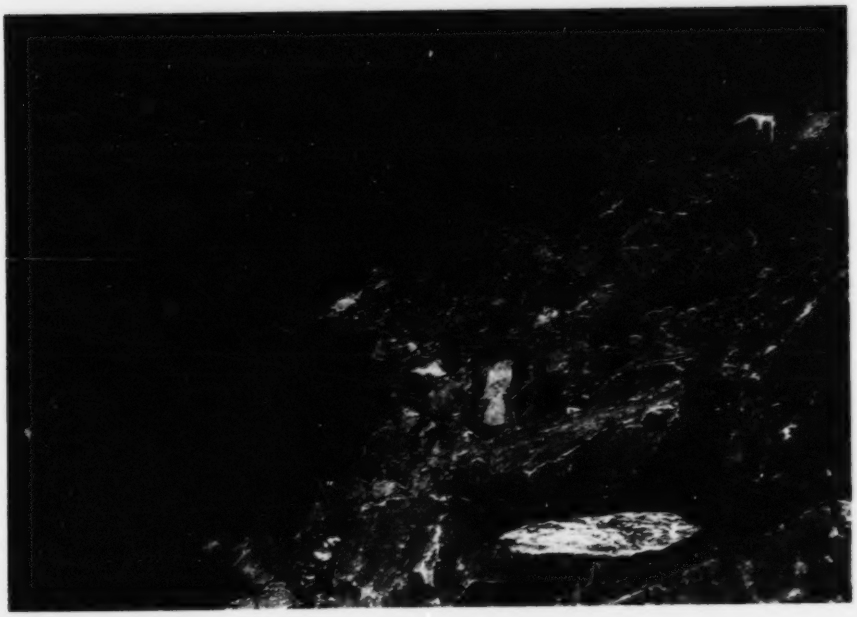
DEWDNEY — Hatzic Slough dyke, upstream of Dewdney, nearing completion.

PITT MEADOWS No. 2 — Richardson Road to Sheridan Hill reconstruction.

Emergency Work

Previously approved emergency works at Sites 'G' and 'G-1' in Kent and at Site '7' in Chilliwack were completed.

No additional emergency work was authorized.



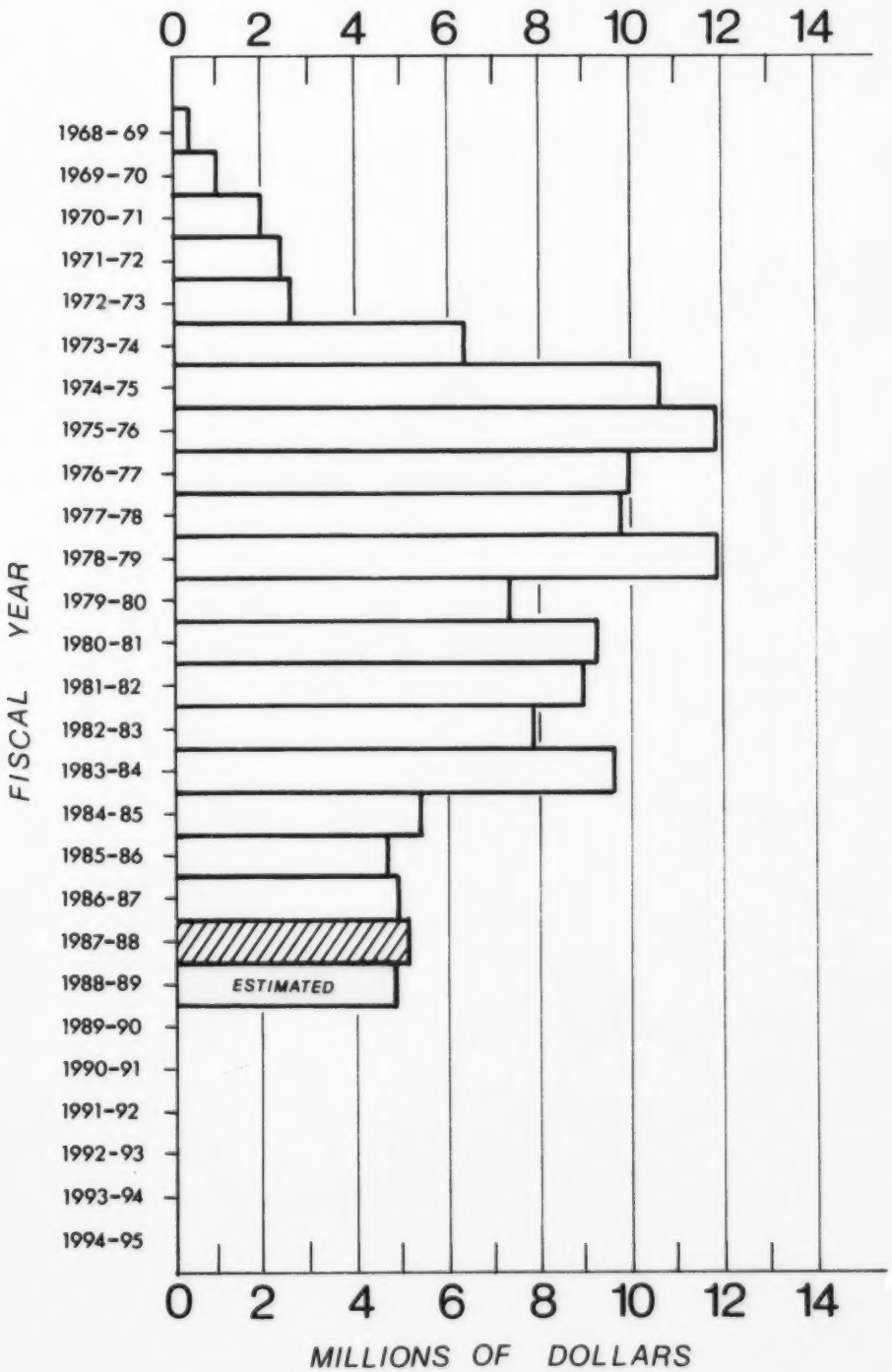
EMERGENCY WORK — Site 'G-1' bank protection.

PROJECT APPROVALS

Projects that have been approved for construction by the Board and Ministers as of the reporting date are listed under "Approved Funds" in the Summary of Expenditures in Table II on page 25.

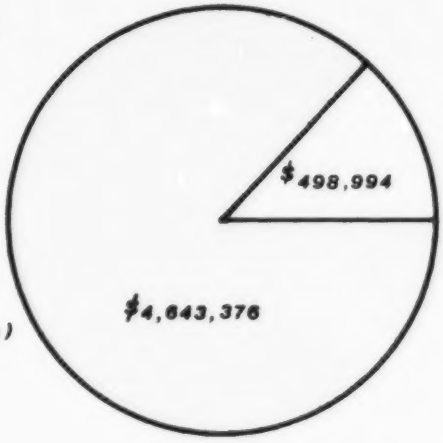
No new projects were approved.

ANNUAL EXPENDITURES



EXPENDITURES & BUDGET

Expenditures; Report Year 1987/88



ENGINEERING, DESIGN AND ADMINISTRATION *

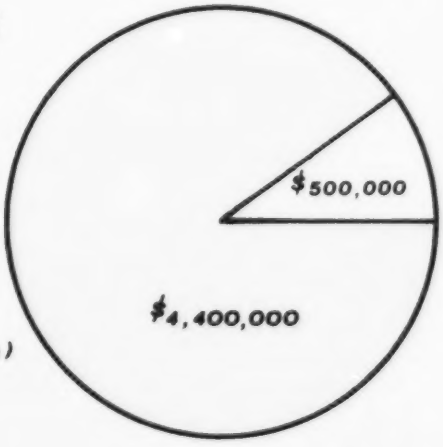
CONSTRUCTION (includes Emergency Work and site supervision)

TOTAL $5,142,370

Total Program Expenditures $129,559,510

(to March 31, 1988)

Expenditures; 1988/89



ENGINEERING, DESIGN AND ADMINISTRATION

CONSTRUCTION (includes Emergency Work and site supervision)

TOTAL $4,900,000

Total Authorized Funding $161,000,000

(to March 31, 1995)

* The excess of total expenditures over the total of approved funds shown on page 25 results from adding the administration expenditures to the design expenditures in the total. As program administration expenditures cannot accurately be apportioned between the individual projects as can the design expenditures, the former are not included in the individual project costs submitted to the Board for approval and are not therefore included in the total of approved funds.

TABLE II

SUMMARY OF EXPENDITURES

No.	Project	Approved Funds		Expenditures to March 31/88	Estimated Future Expend. escal. at 10% p.a.	Total Estimated Expenditures
		Amount	Total Approved Funds			
1.	District of Kent	2,003,825.00 200,382.50 483,000.00 50,000.00* 100,000.00* 76,000.00* 82,000.00* 50,000.00* 43,404.00* 241,500.00* 50,000.00* 460,000.00 100,000.00* 500,000.00*	4,440,111.50	4,073,137.00	326,863.00	4,400,000.00
2.	District of Pitt Meadows Maple Ridge	60,782.75* 23,500.00* 11,100,000.00	11,184,282.75	9,506,914.00	1,393,086.00	10,900,000.00
3.	Township of Richmond	12,983,500.00 5,536,000.00	18,519,500.00	18,470,517.00	429,483.00	18,900,000.00
4.	District of Matsqui	2,511,960.00 36,000.00* 15,000.00* 20,000.00* 12,853.32* 23,808.00* 1,500,000.00	4,119,621.32 (797,000.00)**	4,089,586.00	—	4,089,586.00
5.	District of Chilliwack	5,847,435.00 2,425,782.40 70,100.00* 20,000.00* 50,000.00* 100,000.00*	8,513,317.40	6,544,048.00	2,630,000.00	9,174,048.00
5.1	District of Chilliwack Vedder River	1,213,250.00 25,924.50* 6,325,000.00	7,564,174.50	7,525,778.00	—	7,525,778.00
6.	District of Delta	12,102,255.00 6,426,925.00 1,300,000.00	19,829,180.00 (568,814.00)[o]	15,857,452.00	2,842,548.00	18,700,000.00
7.	District of Mission	25,000.00	25,000.00	—	50,000.00	50,000.00
8.	District of Abbotsford	99,864.00* 460,000.00 450,000.00 25,300,000.00	26,309,864.00	24,702,696.00	—	24,702,696.00
9.	Harrison Hot Springs	—	—	45,340.00	1,004,660.00	1,050,000.00
10. 10.1 10.2	District of Surrey Serpentine Nicomekl Dams South Westminster	 1,201,750.00 5,500,000.00	 1,201,750.00 5,500,000.00	 1,175,254.00 4,550,553.00	 — —	 1,175,254.00 4,550,553.00
11.	City of New Westminster	2,919,486.00 332,434.00	3,251,920.00	3,181,299.00	—	3,181,299.00
14.1 14.2	City of Port Coquitlam & District of Coquitlam Coquitlam River	5,560,000.00 17,000.00* —	5,577,000.00 —	3,967,795.00 —	— 7,100,000.00	3,967,795.00 7,100,000.00
17.	Seabird Island	40,000.00* 85,520.90* 30,000.00*	155,520.90	138,844.00	—	138,844.00
18.	Dewdney Improve District	10,000.00* 7,125,000.00	7,135,000.00	6,149,873.00	600,127.00	6,750,000.00
19.	Nicomen Island Improvement District	100,000.00* 50,000.00* 2,500.00* 3,500.00* 15,000.00* 30,000.00* 50,000.00* 60,000.00* 3,000.00* 856,750.00* 357,075.00* 437,000.00*	1,964,825.00	1,901,045.00	—	1,901,045.00
20. 20.1	City of Kamloops Oak Hills	— 1,283,400.00	— 1,283,400.00	— 1,051,444.00	6,600,000.00 —	6,600,000.00 1,051,444.00
21.	Glen Valley	—	—	—	3,500,000.00	3,500,000.00
22.	Salmon River	—	—	—	50,000.00	50,000.00
Pre-Agreement Construction		210,092.62	210,092.62	—	—	—
Construction Cost Totals				112,931,575.00	26,526,767.00	139,458,342.00
Upstream Storage Cost Design & Administration Costs Miscellaneous Emergency Works Emergency Works		100,000	100,000.00 (3,398,082.17)[o]	1,057,015.00 15,570,920.00 — (3,371,831.23)	— 4,913,723.00 — —	1,057,015.00 20,484,643.00 — (3,371,831.23)
TOTALS			126,884,559.99	129,559,510.00	31,440,490.00	161,000,000.00

* Emergency Work.
** Cost not shared by Federal Government and not charged to Program.
[o] Cost not shared by Province and not charged to Program.
[m] These costs are included in the various projects.

NOTE: The amount shown under Approved Funds includes the 15% contingency allowance where necessary.

CONSULTANT SERVICES

Table III presents a list of consultants directly employed by the Province for the dyking program under the May 24, 1968 Agreement. The table indicates the assignments given to the consultants and the projects on which each consultant has been engaged.

TABLE III

CONSULTANT SERVICES

Firm of Consultants	Assignment	Projects
Associated Engineering Services Ltd.[1]	General engineering services for the design of dykes and internal drainage works, and supervision of construction.	Districts of Pitt Meadows, Matsqui and Delta, City of New Westminster, New Westminster (Queensborough area).
	Design and supervision of construction for rehabilitation of the Serpentine-Nicomekl River Dams.	District of Surrey.
	Assessment of the Sumas Dam and Pump Stations.	District of Abbotsford.
	Design of standard pump station.	General.
Murray & Associates	Legal surveys.	District of Delta.
CBA Engineering Ltd.	General engineering services for the design of dykes and internal drainage works, and supervision of construction.	Township of Richmond.
	General engineering services for design of dykes and internal drainage works.	District of Mission.
	General engineering services for design of dykes.	Glen Valley.
Golder, Brawner & Associates Ltd.	Consultant services for soils investigations with regard to dyke improvements and soil consultant services during construction.	Districts of Kent, Pitt Meadows, Matsqui, Mission, Delta, Surrey (Serpentine-Nicomekl Valley), and Coquitlam.
McElhanney Associates	Legal surveys.	District of Chilliwack.
Ripley, Klohn & Leonoff[2]	Consultant services for soils investigations with regard to dyke improvements and soil consultant services during construction.	Township of Richmond, District of Chilliwack, Chilliwack Indian Reserves 3 and 4, Districts of Abbotsford (formerly Sumas), Surrey (South Westminster area) and S. Dewdney Dyking District.
	General engineering services for design of dykes.	
Willis Cunliffe Tait & Company Ltd.	General engineering services for the design of dykes and internal drainage works, and supervision of construction.	Districts of Kent and Chilliwack.
	Preliminary design and cost of alternative proposal for the Hope Slough pump station.	District of Chilliwack.
Piteau Gadsby MacLeod Ltd.	General engineering services for design of dykes and internal drainage works, and supervision of construction.	City of Kamloops (Oak Hills dyking project).
Tunbridge & Tunbridge	Legal surveys.	District of Kent.
William Kerr	Legal surveys.	District of Matsqui.
F.R. Bonn	Legal surveys.	District of Matsqui.

[1]Now Associated Engineering (B.C.) Ltd.

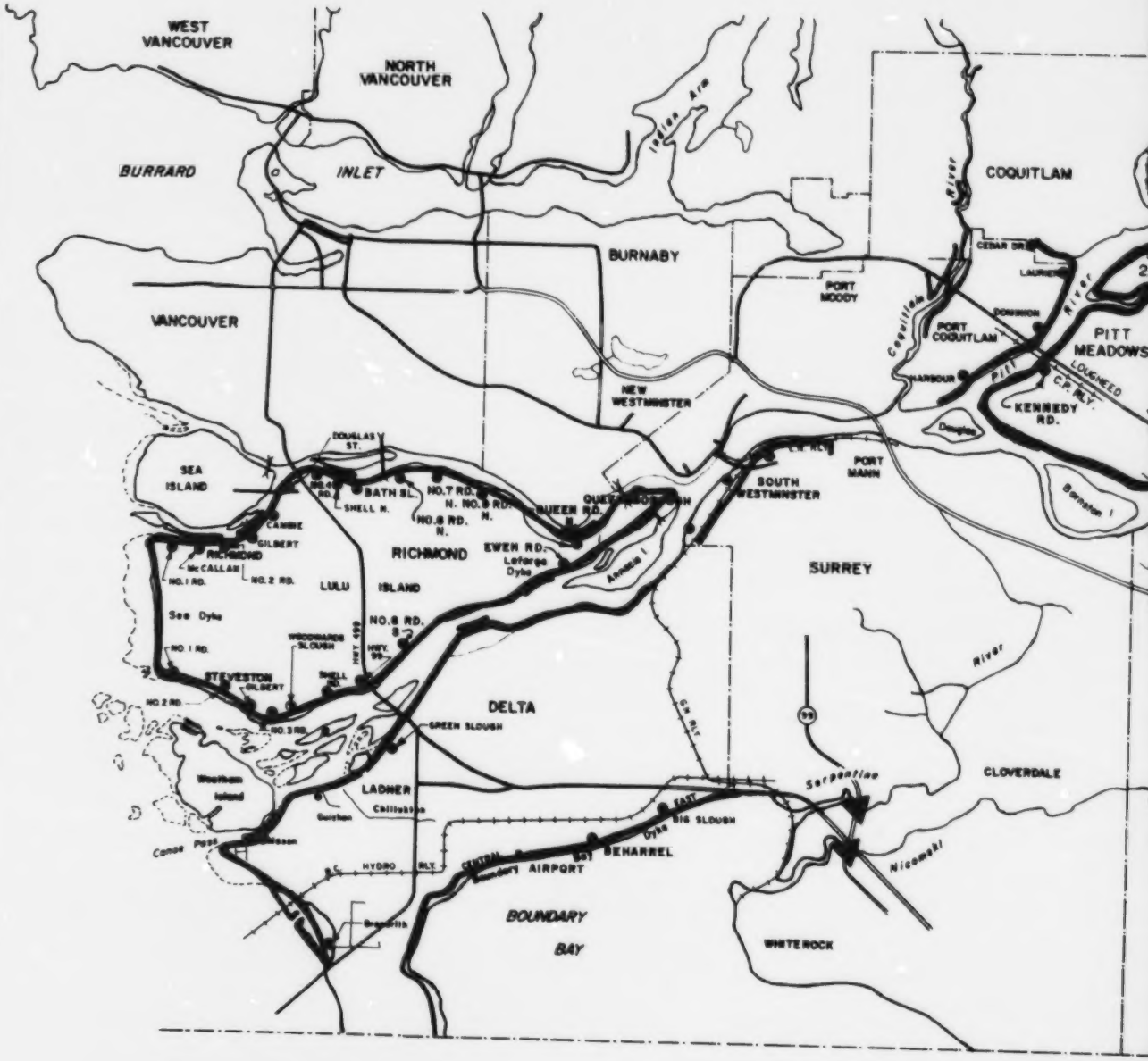
[2]Now Klohn Leonoff Ltd.

TABLE III (cont'd)

Firm of Consultants	Assignment	Projects
Cook Pickering & Doyle Ltd.	Consultant services for soils investigations with regard to dyke improvements and soil consultant services during construction.	District of Chilliwack.
Crippen Consultants	General engineering services for design of dykes and internal drainage works, and supervision of construction.	District of Coquitlam and City of Port Coquitlam, Districts of Surrey (South Westminster area), and Abbotsford.
Western Canada Hydraulic Laboratories Ltd.	Assessment of the fluvial geomorphology of the Vedder River.	District of Chilliwack, Vedder River Project.
Rivers Section Water Management Br. Ministry of Environment and Parks Province of B.C.	Detail design of Phase III — Setback Dykes, and supervision of construction. Design and supervision of bank protection.	District of Chilliwack, Vedder River Project. Districts of Chilliwack, Kent and Delta, Nicomen Island and Dewdney Dyking Districts, Township of Richmond, City of New Westminster (Queensborough).
Hillis Consulting Services Ltd.	Geotechnical advice for setback dykes.	District of Chilliwack, Vedder River Project.
Interwest Property Services Ltd.	Responsible for negotiations and land purchase for the Vedder River Project.	District of Chilliwack, Vedder River Project.
Alland and Ashford[1]	Investigation and design for reconstruction of the Duncan-Bateson Floodbox.	District of Kent.
Sandwell Swan Wooster Inc.	Assessment of river dynamics in the Harrision Mills area.	District of Kent.

[1]Now Ashford and Associates Ltd.

MAP OF LO


WEST VANCOUVER
NORTH VANCOUVER
BURRARD
INLET
Indian Arm
COQUITLAM
BURNABY
VANCOUVER
PORT MOODY
PORT COQUITLAM
PITT MEADOWS
NEW WESTMINSTER
KENNEDY RD.
SEA ISLAND
BATH SL.
QUEEN RD.
SOUTH WESTMINSTER
PORT MANN
RICHMOND
EWEN RD.
Leforge Dyke
SURREY
LULU ISLAND
Sea Dyke
NO.6 RD.
STEVESTON
DELTA
GREEN SLOUGH
LADNER
BIG SLOUGH
BEHARREL
AIRPORT
BOUNDARY BAY
WHITE ROCK
CLOVERDALE
Serpentine
Nicomekl
Fraser River

MAP OF LOWER FRASER VALLEY SHOWING FLOOD CONTROL WORKS UNDER CONSTRUCTION FOR THE PERIOD - APRIL 1,1987 TO MARCH 31,1988.